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A. Information Category

- [ ] Abstract
- [ ] Journal Article
- [ ] Summary
- [ ] Internet
- [ ] Visual Aid
- [ ] Software
- [ ] Full Paper
- [ ] Report
- [x] Other NOC

B. Document Number DOE\RL-2002-36 Rev. 3

C. Title
Radioactive Air Emissions Notice of Construction for Characterization/Stabilization Activities Involving Radioactive Contamination at Facilities on the Central Plateau

REISSUED FOR EDITORIAL PURPOSE PM Hart for GJ LeBaron 6/5/06

D. Internet Address

E. Required Information (MANDATORY)

1. Is document potentially Classified? (●) No ( ) Yes

(See Blk. H)
Manager Required (Print and Sign)

If Yes NA Homan, NA Homan (●) No ( ) Yes Classified
ADC Required (Print and Sign)

2. Official Use Only (●) No ( ) Yes Exemption No. ____
3. Export Controlled Information (●) No ( ) Yes OUO Exemption No. 3
4. UCNI (●) No ( ) Yes
5. Applied Technology ( ) No ( ) Yes
6. Other (Specify) ____

7. Does Information Contain the Following:

a. New or Novel FH (Patentable) Subject Matter? (●) No ( ) Yes
If "Yes", OUO Exemption No. 3
If "Yes", Disclosure No.: ____

b. Commercial Proprietary Information Received in Confidence, Such as Proprietary and/or Inventions?
(●) No ( ) Yes If "Yes", OUO Exemption No. 4

c. Corporate Privileged Information? (●) No ( ) Yes
If "Yes", OUO Exemption No. 4

d. Government Privileged Information? (●) No ( ) Yes
If "Yes", Exemption No. 5

e. Copyrights? (●) No ( ) Yes If "Yes", Attach Permission.

f. Trademarks? (●) No ( ) Yes If "Yes", Identify in Document.

8. Is information requiring submission to OSTI? (●) No ( ) Yes

9. Release Level? (●) Public ( ) Limited

F. Complete for a Journal Article

1. Title of Journal N/A

G. Complete for a Presentation

1. Title for Conference or Meeting N/A
2. Group Sponsoring ____
3. Date of Conference ____
4. City/State ____
5. Will Information be Published in Proceedings? ( ) No ( ) Yes
6. Will Material be Handed Out? ( ) No ( ) Yes

H. Author/Requestor
G. J. LeBaron [signature]
(Print and Sign)

Responsible Manager
R. E. Gregory [signature] for
(Print and Sign)

Approval by Direct Report to FH President (Speech/Articles Only) ____
(Print and Sign)

I. Reviewers

	Yes	Print	Signature	Public Y/N (If N, complete J)
General Counsel	[x]	S. B. Cherry	(Pg. 2) [signature] for per email 5/17/06	(Y) / N
Office of External Affairs	[ ]			Y / N
DOE-RL	[x]	W. C. Woolery	[signature] 5/18/06	(Y) / N
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J. If Additional Comments, Please Attach Separate Sheet 1 of 2

Information Clearance Approval

APPROVED FOR RELEASE — OFFICIAL DOCUMENT

J. D. Aardal
06/05/2006

A-6001-401 (02/06)

Reissue
DOE/RL-2002-36
Rev. 3

Aardal, Janis D

From:	Cherry, Stephen B
Sent:	Wednesday, May 17, 2006 9:46 AM
To:	LeBaron, Gregory J
Subject:	RE: Approval of the Characterization/Stabilization Notice of Construction

Greg,

As we discussed, I approve of the changes to the referenced document and authorize you to sign for me as concurring.

Steve

From:	LeBaron, Gregory J
Sent:	Wednesday, May 17, 2006 9:21 AM
To:	Cherry, Stephen B
Subject:	Approval of the Characterization/Stabilization Notice of Construction

DOE/RL-2002-36, rev 3, *Radioactive Air Emissions Notice of Construction for Characterization/Stabilization Activities Involving Radioactive Contamination at Facilities on the Central Plateau*, has been revised and is being issued. You, as general counsel, have been asked to review the document and sign the *Information Clearance Form*. On the *Information Clearance Form*, the signators are asked, "Public Y/N". I have FAXed the *Administrative Document Processing and Approval* form and *Information Clearance Form* for your use and I e-mailed the balance of the document yesterday. Please provide your approval with a response to the "Public" question.

Thanks,

Greg

ADMINISTRATIVE DOCUMENT PROCESSING AND APPROVAL

DOCUMENT TITLE:	OWNING ORGANIZATION/FACILITY:
Radioactive Air Emissions Notice of Construction for Characterization/Stabilization Activities Involving Radioactive Contamination at Facilities on the Central Plateau	Central Plateau Surveillance and Maintenance
Document Number: DOE/RL-2002-36	Revision/Change Number: 3 Reissue

DOCUMENT TYPE *(Check Applicable)*

☐ Plan ☐ Report ☐ Study ☐ Description Document ☒ Other NOC

DOCUMENT ACTION ☐ New ☒ Revision ☐ Cancellation

RESPONSIBLE CONTACTS

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Manager:	R. E. Gregory	373-9980

DOCUMENT CONTROL

Does document contain scientific or technical information intended for public use? ☒ Yes ☐ No

Does document contain controlled-use information? ☐ Yes ☒ No

("Yes" requires information clearance review in accordance with HNF-PRO-184)

DOCUMENT REVISION SUMMARY

NOTE: Provide a brief description or summary of the changes for the document listed.

Change reference to Guzzler as truck-mounted vacuum
Change "Radiological Control" organization as "radiological control" organization
Make other editorial changes

REVIEWERS

Others

Name *(print)*	Organization
G. J. LeBaron	Environmental Compliance
J. A. Bates	Environmental Compliance
B. J. Kerr	Deactivation & Decommissioning

APPROVAL SIGNATURES

	Date
Author: [signature]	16 May '06
Name: (Print) G. J. LeBaron	
Responsible Manager:	
Name: (Print) R. E. Gregory [signature]	5/15/06
Other:	
Name: (Print)	Date

RELEASE / ISSUE

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DOE/RL-2002-36
Revision 3
REISSUE

Radioactive Air Emissions Notice of Construction for Characterization/Stabilization Activities Involving Radioactive Contamination at Facilities on the Central Plateau

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

DOE/RL-2002-36
Revision 3
REISSUE

Radioactive Air Emissions Notice of Construction for Characterization/Stabilization Activities Involving Radioactive Contamination at Facilities on the Central Plateau

G. J. LeBaron
Fluor Hanford, Inc.

Date Published
May 2006

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States
Department of Energy
P.O. Box 550
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J. D. Aardal 6/5/2006
Release Approval Date

Approved for Public Release;
Further Dissemination Unlimited

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TERMS

ALARA	as low as reasonably achievable
ALARACT	as low as reasonably achievable control technology
APQ	annual possession quantity
BARCT	best available radionuclide control technology
CAM	continuous air monitor
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
cpm	counts per minute
DOE-RL	U.S. Department of Energy
dpm	disintegrations per minute
FH	Fluor Hanford
GM	Geiger-Mueller (detector tube)
HEPA	high-efficiency particulate air (filter)
HVU	HEPA filtered vacuum unit
LIGO	Laser Interferometer Gravitational Wave Observatory
MEI	maximally exposed individual
NOC	notice of construction
PAM	portable alpha meter
PCM	periodic confirmatory measurements
PTE	potential-to-emit
PTRAEU	portable temporary radioactive air emissions unit
PUREX	Plutonium-Uranium Extraction (Plant)
RCT	radiological control technician
REDOX	Reduction oxidation (S Plant)
RL	DOE, Richland Operations Office
S&M	surveillance and maintenance
SEPA	*State Environmental Policy Act of 1971*
TEDE	total effective dose equivalent
UO_3	Uranium Trioxide Facility
WAC	*Washington Administrative Code*
WDOH	State of Washington, Department of Health

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	**Multiply by**	**To get**	**If you know**	**Multiply by**	**To get**
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	meters	3.28084	feet
yards	0.9144	meters	meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1993, Professional Publications, Inc., Belmont, California.

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION FOR CHARACTERIZATION/STABILIZATION ACTIVITIES INVOLVING RADIOACTIVE CONTAMINATION AT FACILITIES ON THE CENTRAL PLATEAU

This document serves as a notice of construction (NOC) pursuant to the requirements of *Washington Administrative Code* (WAC) 246-247-060 for performing characterization activities on the Hanford Site Central Plateau in facilities and associated ancillary buildings that do not have active ventilation systems.

Minimum safe surveillances are performed currently at these facilities, which are in surveillance and maintenance (S&M) mode (i.e., active processing has ceased with radioactive feed materials no longer being brought in). These S&M activities include minor activities such as exterior and interior inspections; checking the status of door security, any unauthorized building intrusions and structural integrity; water intrusion cleanup; waste handling/removal; maintaining radiological airborne control zones; animal or insect intrusion abatement; maintaining operating systems and building integrity, eliminating utilities when possible; identifying and reducing hazards; and housekeeping.

This NOC covers activities that will be conducted in support of characterization/stabilization of facilities that are not part of a removal or remedial action being performed by the U. S. Department of Energy (DOE) under *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) because CERCLA actions are exempted by law from the requirement to obtain permits. This NOC addresses characterization efforts that will be undertaken to determine the operational, standby, or shutdown conditions of facilities and associated cells, gloveboxes, hoods, tanks and vessels, piping, and utilities.

The public maximally exposed individual (MEI) location with respect to the 200 East Area is located at Energy Northwest (commercial power production facility on the Hanford Site) and with respect to the 200 West Area is located at the Laser Interferometer Gravitational Wave Observatory (LIGO). The unit dose conversion factors (HNF-3602), using the CAP88 PC computer model with Hanford Site specific default values, were used to calculate the potential total effective dose equivalent (TEDE) to the MEI. The MEI location at LIGO is more restrictive than the MEI location at Energy Northwest. Therefore, the MEI location for the Central Plateau is considered LIGO, regardless of whether activities take place in 200 East Area or 200 West Area. The estimated potential TEDE resulting from the potential emissions from the combined characterization/stabilization and baseline activities at the worst-case facility on the Central Plateau is less than 0.051 mrem per year to the MEI at LIGO.

1.0 LOCATION

Name and address of the facility, and location (latitude and longitude) of the emission unit(s).

The Central Plateau includes facilities operated by Fluor Hanford (FH) (or successors) located in the 200 West Area (e.g., 231-Z, Uranium-Trioxide Facility [UO_3], 224-T, 222-T, and ancillary buildings associated with U Plant, Reduction Oxidation [REDOX], etc.), 200 East Area (e.g., ancillary buildings associated with the Plutonium-Uranium Extraction (PUREX) Plant and B Plant Complex, 224-B, 242-B/BL, 209-E, etc.), and adjacent 600 Area (e.g., 212-N, 212-P, and 212-R) on the Hanford Site (Figure 1).

The address and geodetic coordinates for the Central Plateau (represented by the Hanford Meteorological Station) are as follows:

U.S. Department of Energy (DOE), Richland Operations Office (RL)
Hanford Site
Richland, Washington 99352

46° 33' 48" North Latitude
119° 36' 22"West Longitude.

2.0 RESPONSIBLE MANAGER

Name, title, address, and phone number of the responsible manager.

Mr. Matthew S. McCormick, Assistant Manager for Central Plateau
U.S. Department of Energy, Richland Operations Office
P.O. Box 550
Richland, Washington 99352
(509) 373-9971

3.0 PROPOSED ACTION

Identify the type of proposed action for which this application is submitted.
a. Construction of new emission unit(s), or
b. Modification of existing emission unit(s); identify whether this is a significant modification.

The proposed action will not represent a significant modification. The proposed action will be to enter facilities and associated ancillary buildings on the Central Plateau that do not have active ventilation systems to obtain characterization data of the rooms, equipment, vessels, piping, and utilities, or to stabilize the same. The proposed action will have the potential to create new sources for point, passive, diffuse, and fugitive emissions.

4.0 STATE ENVIRONMENTAL POLICY ACT

If this project is subject to the requirements of the State Environmental Policy Act of 1971 (SEPA)contained in Chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.

The proposed activities are exempt categorically from SEPA requirements in accordance with WAC 197-11-845.

5.0 PROCESS DESCRIPTION

Describe the chemical and physical processes upstream of the emission unit(s).

All work will be performed in accordance with the contractor radiological control procedures and the as low as reasonably achievable (ALARA) program requirements. These requirements will be carried out through the activity work packages and associated radiological documentation. A graded approach (shown in Table 1) will be used to match controls with potential contamination levels per radiological control manual and procedure criteria as shown in Table 2. Categories of work based on this graded approach are shown in Table 2.

Descriptions of the facilities and proposed activities are provided in the following sections. (Note: Further reference to the use of radiological control criteria/procedures/decisions is in regard to the radiological control criteria shown in the tables and appendices of this NOC.)

5.1 FACILITY DESCRIPTION

The types of facilities that will be characterized/stabilized under this NOC are in S&M mode or are in transition to S&M mode. The facilities include those listed in Section 1.0, and others as added to the S&M program. A list of facilities that have used this characterization/stabilization NOC during the previous calendar year will be provided annually to the State of Washington, Department of Health (WDOH) by June 30 each year. For planning purposes, a list of planned moderate risk or high risk activities, as described in Section 6.0, that are scheduled for the next quarter will be provided via electronic mail to WDOH by the last business day of each quarter.

5.2 CHARACTERIZATION/STABILIZATION ACTIVITIES

Swipes, smears, air sampling, and other sample collection will be performed to characterize/stabilize contamination levels present in a facility. These activities will be performed on/in containers, vessels, gloveboxes, hoods, pipes, and other equipment or areas associated with a facility.

Characterization/stabilization will involve nondestructive methods (such as surveys and swipes, sampling, or similar methods) and destructive methods (such as breaking or cutting lines, removing flanges on vessels, or similar activities). As detailed in the following, this characterization/stabilization will include opening containers, enclosures, gloveboxes, hoods, pits, sumps, ventilation ducts and systems, and vessels, and/or removal of access ports, shields, or plugs.

Nonintrusive and intrusive characterization/stabilization activities will take place as follows in accordance with the radiological program:

- Conducting measurements to establish radiological conditions/maps (i.e., dose rates, smearable and fixed contamination, and airborne concentrations)

- Nondestructive analyses measurements of equipment

- Collecting liquid and solid samples from open vessels, trenches, or sumps

- Collecting ultrasonic data on vessels and piping

- Entering areas with high or suspected high contamination

- Performing visual inspections

- Removing flanges to collect samples from inside equipment or piping (the radiological control organization will determine the appropriate controls based on preliminary surveys)

- Cutting or drilling into piping, ducts, or vents to collect samples using appropriate equipment such as a reciprocating saw, a circular saw, a hacksaw, a tri-tool, or an abrasive wheel (the radiological control organization will determine the appropriate radiological controls based on preliminary surveys, as shown in Table 1, Table 2, and Appendix A)

- Core drilling into concrete floors/walls

- Draining/removing liquids or solutions from lines, vessels, sumps, pits, pools, or other equipment; treating (using low-energy or manual methods, such as cementation, stabilization, solidification, immobilization, filtration, or size reduction) as needed to render the materials less hazardous or reduce volumes; and transporting waste for disposal

- Excavating soil to access underground utilities, piping, and equipment or to prepare a site for setting up temporary containment structures or obtaining samples, including the use of picks, shovels, rakes, backhoes, drills, front loaders, and similar equipment

- Isolating equipment or systems, such as removing energy sources, disconnecting or cutting in to blank lines, ducts, vents, pipes, conduits, risers, and stacks

- Installing temporary systems to support characterization/stabilization, such as lighting, environmental monitoring or surveillance equipment, safety systems (containment, fences, and similar equipment), and air circulation/filtration/cooling or heating equipment

- Erecting and removing greenhouses (containment tents/structures) and support equipment

- Ventilating work areas using portable exhausters in connection with the greenhouses as well as in other areas, such as exhausting a glovebox or hood, a ventilation duct or system, and similar activities

- Ventilating using a high-efficiency particulate air (HEPA) vacuum in areas such as a glovebag, glovebox, hood, or similar areas or in connection with drilling, grinding, or similar methods

- Applying fixative materials to reduce the spread of contamination

- Decontaminating or stabilizing contaminated areas using either passive methods (such as wiping, cleaning, vacuuming, applying fixatives, or similar methods) or aggressive methods (such as scabbling, grinding, or similar methods)

- For immediate characterization/stabilization or personnel protection needs, removing waste, hazards including asbestos, and equipment (resizing or repackaging as needed) for transfer to appropriate facilities in accordance with radiological control and solid waste acceptance criteria maintained by the waste receiving facilities.

6.0 PROPOSED CONTROLS

Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters^3/sec for the emission unit(s).

Many of the emission controls used for the potential diffuse and fugitive emissions during the characterization/stabilization activities will be administrative, based on ALARA principles, and will consist of ALARA techniques addressed in existing radiological control procedures. It is proposed that these controls (as described in the tables and appendices) be approved as best available radionuclide control technology (BARCT) for activities conducted under this characterization/stabilization NOC.

A graded approach will be used to match expected contamination levels with appropriate work controls. The containment guidance in Table 1 is derived from existing radiological control procedures and will be used to determine the containment risk level for specific work activities, (i.e., very low risk, low risk, moderate risk, and high risk). Characterization activities and excavation activities are combined with containment risk levels from Table 1 to define work categories and the associated controls, monitoring, and required documentation shown in Table 2.

Radiological control technician (RCT) coverage will be provided for all contamination-related activities, as described in radiological documentation and associated work packages/procedures. Containment tents, glovebags, and other isolation barriers will be provided as determined by the radiological control organization, using ALARA principles and the containment guidance shown in Appendix A. Moderate risk and high risk levels will require RCT approval as described in Appendix B, for containment tents/greenhouses/enclosures, and as described in Appendix C, for glovebags.

Logsheets will be used to record characterization/stabilization/excavation work activities covered by this NOC, which have a potential to disturb contamination (i.e., routine S & M activities, which previously did not require NOC coverage, will continue without requiring logsheets). Example logsheets for characterization activities and excavation activities are shown in Appendix D. Factors for the very low-risk, low-risk, moderate-risk, and high-risk characterization activities (Category 1) and very low-risk, low-risk, moderate-risk, and high-risk excavation activities (Category 2) are shown in Table 3. These factors are the Ci per area or Ci per volume for the respective risk categories as described in Section 9.0. The logsheets will require tracking total surface area or volume as appropriate, and use the appropriate Table 3 factors to track potential curies released.

The basis for a hypothetical bounding building is described in Section 10.0 and shown in Table 4. An annual limit (potential Ci released per year) for each category is shown in Table 5 and described in Sections 10.0 and 13.0. The logsheets will be used to track compliance with limits in Table 5 for each facility that performs activities covered by this NOC. An annual maximum of ten facilities will be observed for performing moderate or high risk work activities under this NOC.

RCT coverage will be provided during all excavation activities. Appropriate controls such as water, fixatives, covers, containment tents, or windscreens would be applied, if needed, as determined by the radiological control criteria described in Table 2 and the appendices.

As appropriate, before starting work on isolating utilities and piping, removable contamination in the affected area(s) will be reduced to ALARA. Measures such as decontamination by wiping with wet rags, expandable foam, fixatives, or glovebags also will be used as determined by the radiological control organization, as described in the tables and appendices, to help minimize contamination.

Potentially contaminated excavated soils will be stockpiled in an appropriately posted area(s) adjacent to excavation locations. Contaminated stockpiles subject to winds of greater than 20 miles per hour, as indicated by the daily forecast by the Hanford Meteorological Station, or stockpiles inactive for greater than 24 hours will receive positive dust control measures as determined by the radiological control organization, as described in the tables and appendices. Backfill will be conducted using the original material removed or with suitably clean soil brought in for this purpose.

If needed or chosen for use during these activities, the sitewide truck-mounted vacuum would be used in accordance with the latest approvals of the NOC ("Categorical Notice of Construction for use of the Guzzler™ Vacuum Excavation System for Radiologically Limited Activities on the Hanford Site," [approved by WDOH on December 18, 1998] or "guzzler NOC") (99-SID-021).

Liquids will be transferred, as needed, in accordance with latest approval of the NOC for tanker truck loading of radioactively contaminated wastewater (DOE/RL-2002-56). Liquid that does not meet the acceptance criteria of the tanker truck NOC (e.g., the basin at 242-B/BL) will require a separate NOC or as low as reasonably achievable control technology (ALARACT) demonstration before performing transfers, as it is not covered by the scope of this NOC.

When the use of a portable temporary radioactive air emissions unit (PTRAEU) exhauster or a HEPA-filtered vacuum unit (HVU) results in the establishment of a new direct pathway to the environment (i.e., a specific emission point with abatement controls), the PTRAEU or HVU would be used in accordance with the latest approvals of the PTRAEU and HVU NOCs (DOE/RL-96-75 and DOE/RL-97-50 respectively). When a PTRAEU or HVU is used within a larger enclosed, controlled, and monitored and/or filtered airspace (such as the configuration shown in Figures 2 and 3), essentially recirculating air within that enclosed, controlled, monitored and/or filtered air space, separate tracking as identified under the PTRAEU or HVU NOC will not be required.

The vessel vent systems at the 224-T and 224-B Buildings have a pathway to the 291-T-1 and 296-B-1 Stacks, respectively. Other emissions from the 224-T and 224-B Buildings primarily are diffuse and fugitive. Potential emissions for these very low flow vessel vent, underground ventilation pathways to the 291-T-1 Stack and the 296-B-1 Stack are minimal and will provide no numeric impact on the potential-to-emit (PTE) estimates for this NOC. Although realistically none are expected, any emissions from these systems will be accounted for by existing monitoring at these licensed stacks. If at some time these stacks are shut down (for maintenance or permanently closed), the potential emissions from the 224-T and 224-B Buildings will be subject only to the general diffuse and fugitive pathway.

7.0 DRAWINGS OF CONTROLS

Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.

Emission controls to be used during many of these activities will be defined administratively, based on the ALARA principles and ALARA techniques described in this NOC. Figure 2 and Figure 3 show conceptual alternate configurations for control technology components for the highest risk level for characterization/stabilization activities that are further described in Section 10.0.

Abatement controls associated with tanker trucks, truck-mounted vacuum, HVU, or PTRAEU units are described in the respective NOCs.

8.0 RADIONUCLIDES OF CONCERN

Identify each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI.

All isotopes associated with historical Hanford Site operations, e.g., strontium-90, cesium-137, uranium isotopes (234, 235, 236, and 238), plutonium (Pu) isotopes (238 and 239/240), and americium (Am)-241 are anticipated. However, for purposes of tracking PTE for this NOC, gross beta/gamma contamination will be treated conservatively as being represented entirely by cesium-137 and gross alpha contamination will be treated conservatively as being represented entirely by americium-241 to address radionuclides that could represent greater than 10 percent of the PTE except in uranium only facilities, such as the UO3 facility, where the alpha will be conservatively represented entirely by uranium-234. No radionuclide will contribute greater than 0.1 millirem per year PTE TEDE to the MEI.

9.0 MONITORING

Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements.

The cumulative potential unabated offsite dose associated with activities under this NOC is calculated to be less than 0.1 millirem per year. Therefore, in accordance with 40 Code of Federal Regulations (CFR) 61, Subpart H, and WAC 246-247-075, periodic confirmatory measurements (PCM) will be made to verify low emissions.

The proposed PCM will consist of radiological surveys (smear samples). This method of PCM is not a direct measurement of effluent emissions. The surveys will be performed to demonstrate that contamination levels are below the criteria specified in Section 10.0 to define the categories shown in Table 2. As such, the actual emissions will be below the estimated emissions, as estimated emission rates will be based on a highly conservative fraction of release for smearable contamination levels (refer to Sections 10.0 and 13.0).

Diffuse/fugitive emissions will be monitored using the 200 Areas near-field ambient air monitors. Sample collection and analysis will follow that of the near-field monitoring program. Analytical results will be reported in the Hanford Site annual radioactive air emissions report, with a copy provided to WDOH.

When a tanker truck, truck-mounted vacuum, PTRAEU, or HEPA-filtered vacuum radioactive air emission unit would be used in a manner requiring separate PCM for emissions (Section 6.0), PCM for emissions from these units will be performed as required by each respective NOC.

A summary of activities conducted under this NOC will be provided to WDOH by June 30 each calendar year, listing the facilities involved during the previous year. The methodology for PCM for verification of low emissions for this NOC will be reported to WDOH in the Hanford Site annual radioactive air emissions report, with a copy provided to WDOH.

10.0 ANNUAL POSSESSION QUANTITY

Indicate the annual possession quantity for each radionuclide.

10.1 BASELINE INVENTORY

The inventory of plutonium at the 231-Z Building, the inventory of uranium at the UO_3 Facility, and the estimated inventory of alpha and beta/gamma contamination at the 242-B/BL building have been used to provide an estimate of the annual possession quantity (APQ) for a hypothetical bounding building to represent the approximately 200 buildings in S&M mode, which could be accessed under this NOC. That bounding estimate is 25 Ci for alpha materials and 100 Ci for beta/gamma materials. The uranium only facilities, such as UO3, are a special case where a bounding estimate of 100 Ci for alpha materials (as uranium-234) and 1 Ci for beta/gamma materials is used. These APQ amounts are used to estimate release rates in Section 10.1 to provide a bounding estimate for calculating potential-to-emit for any given building.

This APQ represents the baseline S&M activities that that have been performed routinely outside of the scope of this NOC. The associated release rates are discussed in Section 13.0. Potential baseline emissions are accounted for by the existing 200 Area near field monitoring program and are included in this NOC.

10.2 CATEGORY 1

Category 1 is defined as characterization/stabilization activities conducted outdoors or in open, stagnant, or passively ventilated buildings. Additional containment is used for higher risk levels. Risk levels are established using Table 1 and additional containment is identified in Table 2.

Stabilization/characterization activities involve disturbing a portion of the source term at a facility. For the hypothetical bounding building, less than 1% of the source term is assumed to be disturbed during the characterization/stabilization activities planned under this NOC (0.25 Ci alpha and 1 Ci beta gamma). Any building of the approximately 200 buildings in S&M mode covered by this NOC would have less than this amount of material disturbed.

A Ci/unit surface area factor for contaminated surface area (very low-risk characterization/stabilization activities from Table 2) is bounded by assuming each square foot (ft^2 of surface area is contaminated at levels with smearable readings of 200 disintegrations per minute (dpm)/100 square centimeters (cm^2) alpha and 10,000 dpm/100 cm^2 beta/gamma (general contamination levels, allowed to be exceeded only by occasional specks or small areas of localized contamination). For example, the Ci/ft^2 factor for alpha for very low risk characterization/stabilization activities is calculated with the following formula:

$$(0.0929\ m^2/ft^2) \times (200\ dpm/100\ cm^2) \times (4.5\ E\text{-}11\ Ci*100\ cm^2/m^2*dpm) = 8.4\ E\text{-}10\ Ci/ft^2.$$

Similarly, Ci/ft^2 factor for beta/gamma for very low risk characterization/stabilization activities is calculated with the following formula:

$$(0.0929\ m^2/ft^2) \times (10{,}000\ dpm/100\ cm^2) \times (4.5\ E\text{-}11\ Ci*100\ cm^2/m^2*dpm) = 4.2\ E\text{-}8\ Ci/ft^2.$$

The Ci/ft^2 factors for very low risk, low risk, moderate risk, and high risk excavation activities are calculated in a similar fashion as shown in Table 3 (with application of 1.0 E-3 release fraction, as described in Section 13.0).

10.3 CATEGORY 2

Category 2 is defined as excavation activities. Additional mitigating emission controls, such as water sprays, fixatives, etc.) are used for higher risk levels. Risk levels are established using Table 1 and additional controls are identified in Table 2.

Excavation activities involve disturbing a portion of the source term at a facility. For the hypothetical bounding building, less than 10 percent of the source term is assumed to be disturbed during the excavation activities planned under this NOC (2.5 Ci alpha and 10 Ci beta gamma). Any building of the approximately 200 buildings in S&M mode covered by this NOC would have less than this amount of material disturbed.

A Ci/unit volume factor for contaminated soil volume (very low-risk excavation activities from Table 2) is bounded by assuming each ft^3 of soil is contaminated at levels with direct readings from 200 dpm/100 cm^2 and 10,000 dpm/100 cm^2 beta/gamma. Table 4 in *Soil Contamination Standards for Protection of Personnel* (HNF-2418) provides factors for concentrations in soil using instrument responses compared with soil limits for various radionuclides. Assuming a bulk soil density of 98 pounds (lb) $/ft^3$, a factor of 14.2 pCi/g per counts per minute (cpm) might be derived for a portable alpha meter (PAM) with a probe face area of 50 cm^2. Similarly, a factor of 2.82 pCi/g per cpm might be derived for a Geiger-Mueller (GM) P-11 with a probe face of 15 cm^2. Using the general rule of thumb for converting cpm to dpm/100 cm^2, 14 cpm alpha detected above background for a PAM would correspond to approximately 200 dpm/100 cm^2 alpha (multiply by factors of 2 and 7 for area and probe efficiency, respectively). Similarly, 167 cpm beta/gamma detected above background for a GM P-11 would correspond to approximately 10,000 dpm/100 cm^2 beta/gamma (multiply by factors of 6 and 10 for area and probe efficiency, respectively). The Ci/ft^3 factor for alpha for very low risk activities is calculated with the following formula:

$$(98 lb/ft^3) \times (454\ g/lb) \times (14\ cpm) \times (14.2\ pCi/g\ per\ cpm) \times (1E\text{-}12\ pCi/Ci) = 8.8\ E\text{-}6\ \ Ci/ft^3\ alpha.$$

Similarly, Ci/ft^3 factor for beta/gamma for very low-risk excavation activities is calculated with the following formula:

$$(98 lb/ft^3) \times (454\ g/lb) \times (167\ cpm) \times (2.82\ pCi/g\ per\ cpm) \times (1E\text{-}12\ pCi/Ci) = 2.1\ E\text{-}5\ Ci/ft^3\ beta/gamma.$$

The Ci/ft^3 factors for very low-risk, low-risk, moderate-risk, and high-risk excavation activities are calculated in a similar fashion as shown in Table 3 (with application of 1 E-3 release fraction, as described in Section 13.0).

11.0 PHYSICAL FORM

Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas.

The physical form of the radionuclides is particulate solid or liquid (gaseous radionuclide contributions are inconsequential).

12.0 RELEASE FORM

Indicate the release form of each radionuclide in inventory: Particulate solids, vapor or gas. Give the chemical form and ICRP 30 solubility class, if known.

The release form of the radionuclides is particulate solid (gaseous radionuclide contributions are inconsequential).

13.0 RELEASE RATES

Release Rates:
a. New emission unit(s): Give predicted release rates without any emission control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section, or b. Modified emission units(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection (6) of this section. Provide the latest year's emissions data or emissions estimates. Indicate whether the emission unit is operating in a batch or continuous mode.

Baseline S&M activities involve relatively undisturbed radioactive materials. For example, the estimated quantity of plutonium material within the 231-Z Building is confined, so there is very little potential for release. A worker may walk around in the building in street clothing, and there is currently no need for respiratory protection (required if occupational breathing air concentrations for Pu-239 exceed 2 E-13 µCi/ml). Based on the volume of the building, the curies of plutonium present, and the fact that the air concentration is less than 2 E-13 µCi/ml, the actual release rate is on the order of 2 E-10.

Baseline S&M activities currently accounted for by the 200 Area near-field ambient air monitors reflect less disruptive activities than the characterization/stabilization activities described in section 10.2 (less than 1% disturbance). Ongoing routine S&M activities will disturb much less (i.e., less than 0.01%) than the % disturbance factor for characterization/stabilization activities. Using a release fraction of 1.0 E-3, the unabated release rates for baseline activities would result in a net release rate factor of 1.0 E-7. Compared to the 2 E-10 release rate described above, this would be conservative and bounding. For the hypothetical bounding building, the unabated baseline release rates are 2.5 E-6 Ci/yr alpha (as Am-241) and 1.0 E-5 Ci/yr beta/gamma (as Cs-137). For uranium only facilities, like UO3, the unabated baseline release rates are 1.0 E-5 Ci/yr alpha (as U-234) and 1.0 E-7 Ci/yr beta/gamma (as Cs-137). Although the building structure provides a certain level of abatement in the form of containment, there is no active abatement equipment in these buildings; therefore, the abated release rates are considered the same as the unabated release rates.

Category 1 characterization/stabilization activities, as described in Section 10.2, will disturb 1% or less of the radioactive material within a building or site. Using a release fraction of 1.0 E-3, the unabated Category 1 release rates for the hypothetical bounding building are 2.5 E-4 Ci/yr alpha (as Am-241) and 1.0 E-3 Ci/yr beta/gamma (as Cs-137). For uranium only facilities, like UO_3, the unabated Category 1 release rates are 1.0 E-3 Ci/yr alpha (as U-234) and 1.0 E-5 Ci/yr beta/gamma (as Cs-137). Although the building structure provides a certain level of abatement in the form of containment, there is no active abatement equipment in these buildings; therefore, the abated release rates are considered the same as the unabated release rates.

Category 2 excavation activities, as described in Section 10.3, will disturb 10% or less of the radioactive material within an excavation site. Using a release fraction of 1 E-3, the unabated Category 2 release rates for the hypothetical bounding building/excavation site are 2.5 E-3 Ci/yr alpha (as Am-241) and 1.0 E-2 Ci/yr beta/gamma (as Cs-137). For uranium only facilities, like UO_3, the unabated Category 2 release rates are 1.0 E-2 Ci/yr alpha (as U-234) and 1.0 E-4 Ci/yr beta/gamma (as Cs-137). Although abatement occurs from controls employed during excavation, no credit is being taken; therefore, the abated release rates are considered the same as the unabated release rates.

The alpha contributing radionuclides are assumed to be represented by americium-241 (except at UO_3, where the alpha is assumed to be represented by U-234) and the beta/gamma contributing radionuclides are assumed to be represented by cesium-137. Release rate estimates for the baseline activities and the three categories are shown in Table 3. Several work activities shown in Table 2 could have HEPA-type filtration for abatement, but do not necessarily require HEPA-type filtration, as determined by the radiological control organization. High risk work activities and moderate risk work activities (Category 1), with one or more controlled air spaces, will have HEPA-type filtration, which could use a corresponding abatement factor (99.95% removal efficiency) for calculating potential abated emissions. For the emission rates provided in Table 6, it is assumed that the abated emissions are equal to the unabated emissions, i.e., no credit is taken for any engineered abatement systems (as some may not be testable for removal efficiency). The proposed activities will be considered 'batch mode' operations, rather than continuous operations.

Potential release fractions for use of the truck-mounted vacuum or HEPA vacuum units conservatively are assumed as 1.0, in accordance with the respective NOCs (99-SID-021, DOE/RL-97-50). The release fraction for the PTRAEU units is 1.0 E-3, in accordance with the PTRAEU NOC (DOE/RL-96-75). Release rates for activities associated use of the HEPA vacuum units or the truck-mounted vacuum are accounted for in the logsheets in Appendix D by applying an additional factor of 1000 to normalize the data, effectively accounting for a release of fraction of 1.0.

The TEDE to the Hanford Site MEI from all calendar year 2002 U.S. DOE Hanford Site air emissions (point sources and diffuse and fugitive sources) was 0.066 millirem (DOE/RL-2003-19). The emissions resulting from the activities covered by this NOC, in conjunction with other operations on the Hanford Site, will not exceed the National Emission Standard of 10 millirem per year (40 CFR 61, Subpart H).

14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

Identify the MEI by distance and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit.

The MEI locations, identified for the 200 East and 200 West operational areas (HNF-3602), are as follows:

- 200 East Area, Energy Northwest worker, ESE, 16,630 meters (using the PUREX Plant as the representative location for a facility)

- 200 West Area, LIGO worker, ESE, 18,310 meters using the REDOX Facility as the representative location for a facility.

The MEI location at LIGO is more restrictive than the MEI location at Energy Northwest. Therefore, the MEI location for the Central Plateau is considered LIGO for this NOC, regardless of whether activities take place in 200 East Area, 200 West Area, or adjacent 600 Area.

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection(8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without emission controls (the potential-to-emit) using the release rates from subsection (13) of this section. Provide all input data used in the calculations.

Using the unit dose conversion factors (HNF-3602) for cesium 137+D (+D designation indicates that the doses from progeny are included in the reported dose) and americium-241, the estimated potential TEDE to the MEI (LIGO) resulting from the unabated point source, passive, diffuse, or fugitive emissions from baseline activities, previously outside the scope of this NOC, for the hypothetical bounding building described in Section 10.0 is 4.6 E-5 millirem per year.

For the two new categories of activities covered by this NOC (Central Plateau facilities), the estimated potential TEDE to the MEI (LIGO) resulting from the unabated point source, passive, diffuse, or fugitive emissions for the hypothetical bounding building described in Section 10.0 is 0.051 millirem per year (Table 6). Although some of the emissions will be abated, no credit is being taken, thus, the estimated TEDE to the MEI (LIGO) resulting from the abated fugitive or point source emissions from activities covered by this NOC (Central Plateau facilities) is 0.051 millirem per year.

No more than ten facilities per year will perform moderate risk or high risk work activities covered by this NOC. Low risk and very low risk work activities will not count towards that limit of ten facilities. The aggregate total potential TEDE to the MEI for all facilities covered by this NOC (including baseline activities) will be less than 1 mrem per year

16.0 COST FACTORS OF CONTROL TECHNOLOGY COMPONENTS

Provide cost factors for construction, operation, and maintenance of the proposed control technology components and system, if a BARCT or ALARACT demonstration is not submitted with the NOC.

Pursuant to WAC 246-247-110, App. A (16), cost factors for construction, operation, and maintenance of proposed technology requirements are not required. Cost factor inclusion is not applicable, because the emission controls used during the characterization activities will be as approved in the other NOCs (i.e., truck-mounted vacuum, HVU, PTRAEU, tanker truck) and will consist of ALARA techniques described in this NOC.

17.0 DURATION OR LIFETIME

Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

Characterization/stabilization activities covered by this NOC are scheduled to take place starting as early as March 2004 and continuing for an estimated 10 years.

18.0 STANDARDS

Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit(s) described in this application:

ASME/ANSI AG-1
ASME/ANSI N509
ASME/ANSI N510
ANSI/ASME NQA-1
40 CFR 60, Appendix A, Methods 1,1A, 2, 2A, 2C, 2D, 4,5, and 17
ANSI N13.1.

The technology standards for the tanker trucks, truck-mounted vacuum, HEPA Vacuum, and PTRAEU units are addressed under the respective NOCs for these units (DOE/RL-2002-56, 99-SID-021, DOE/RL-96-75, and DOE/RL-97-50, latest revisions, as approved).

The listed control technology standards were considered and the administratively defined, ALARA-based emission controls proposed for the remaining characterization/stabilization activities are not addressed by the standards. The proposed controls are proposed as adequate to limit and control emissions.

19.0 REFERENCES

99-SID-021, letter, J. E. Rasmussen, U. S. Department of Energy, Richland Operations Office, to J. Leitch, U. S. Environmental Protection Agency, Region 10, "National Emissions Standard for Hazardous Air Pollutants Application for Approval of the Categorical Use of the Guzzler Vacuum Excavation System for Radiologically Limited Activities on the Hanford Site," February 1, 1999.

DOE/RL-96-75, Rev. 2, *Radioactive Air Emissions Notice of Construction Portable/Temporary Radioactive Air Emission Units*, September 1999, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-97-50, Rev. 1, *Radioactive Air Emissions Notice of Construction HEPA Filtered Vacuum Radioactive Air Emission Units*, September 1999, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2001-19, Rev. 1, *Radioactive Air Emissions Notice of Construction for Characterization of the 224-T Facility Process Cells*, May 2001, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2003-19, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2002*, June 2003, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2002-56, *Radioactive Air Emissions Notice of Construction for Tanker Truck Loading of Radioactively Contaminated Wastewater*, November 2002, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

HNF-3602, Rev. 1, *Calculating Potential-to-Emit Releases and Doses for FEMPs and NOCs*, February 2002, Fluor Hanford, Richland, Washington.

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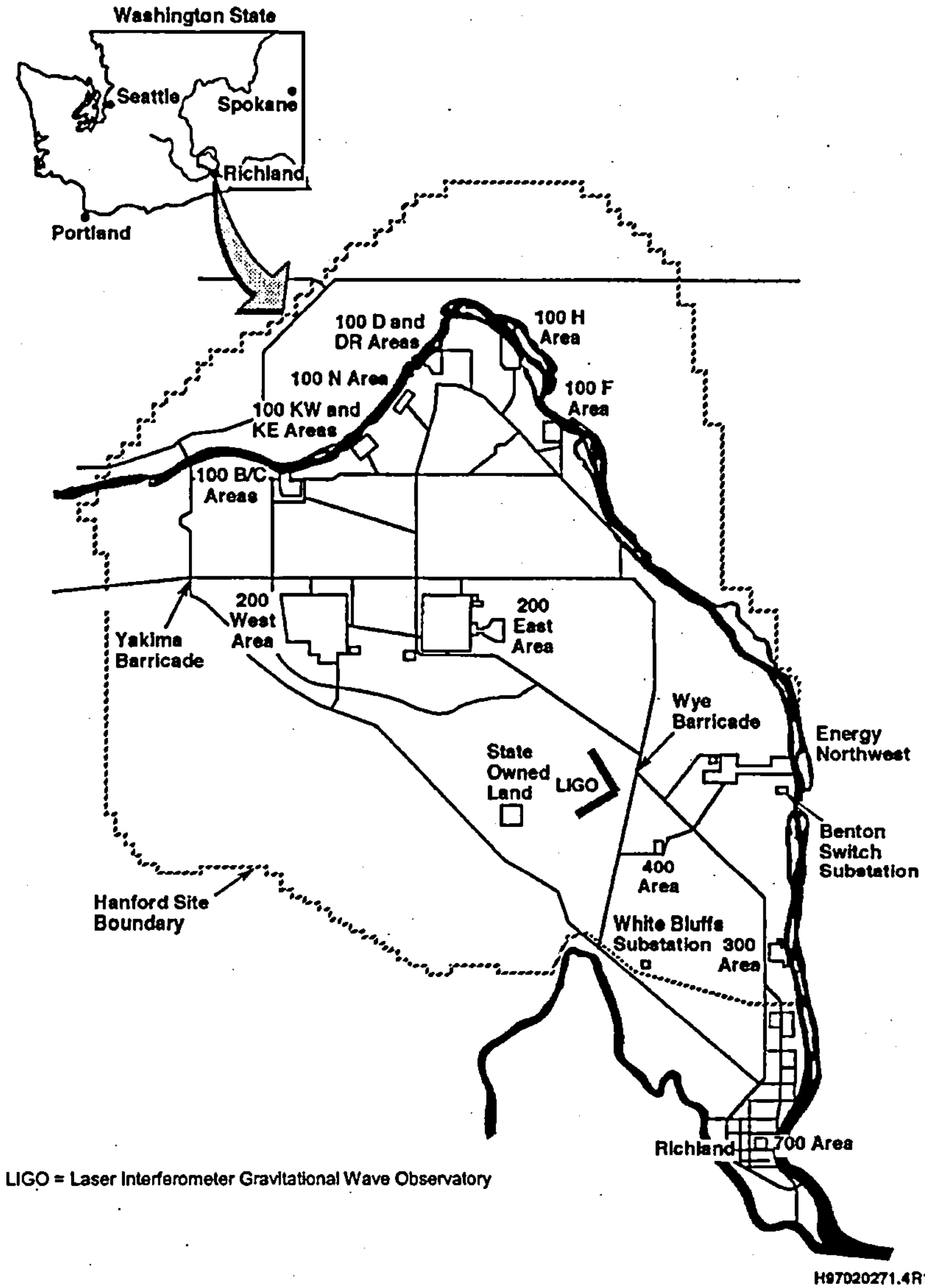

Figure 1. Hanford Site.

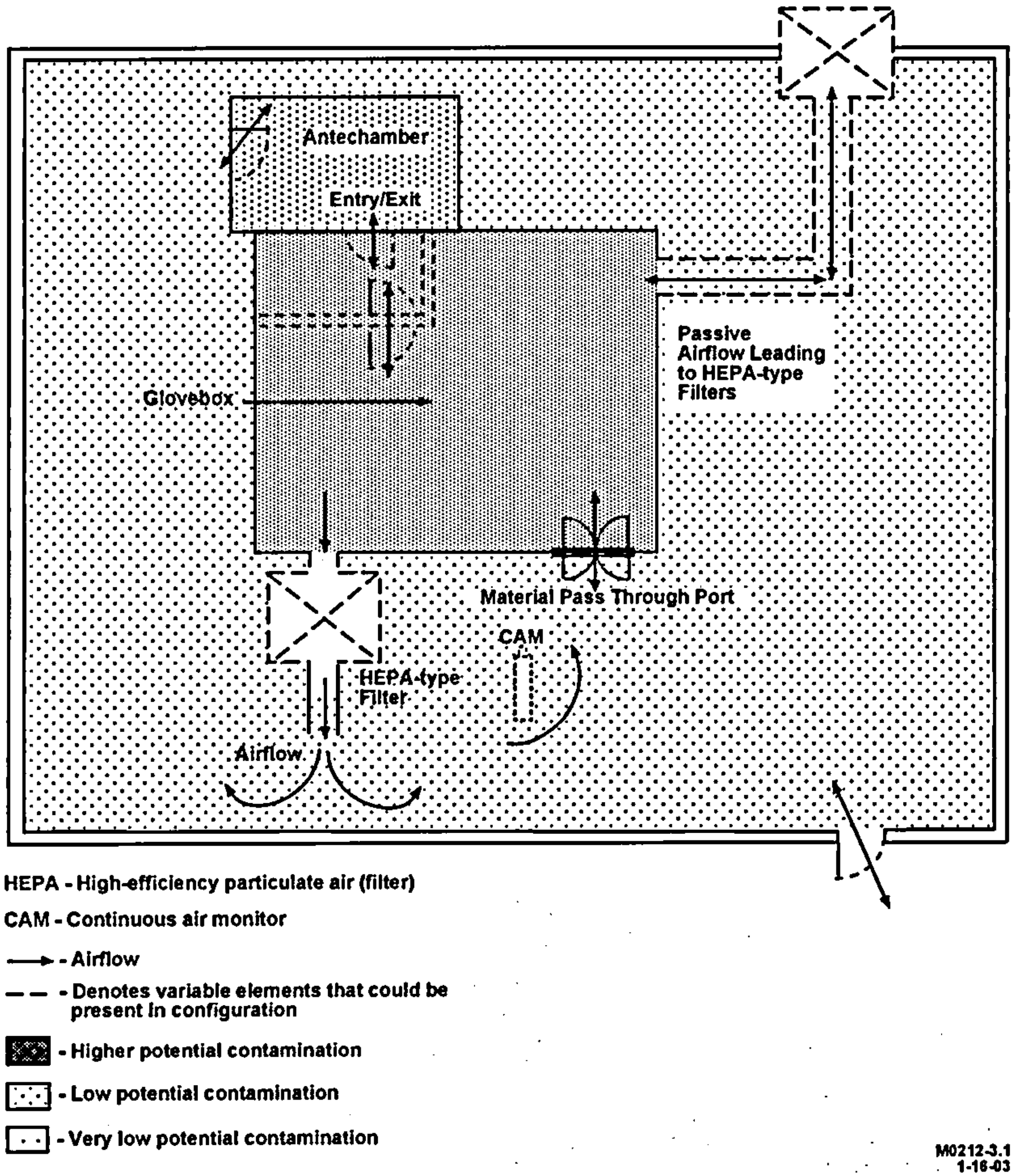

Figure 2. Conceptual Configuration for Category 1, High Risk with Two Controlled Air Spaces.

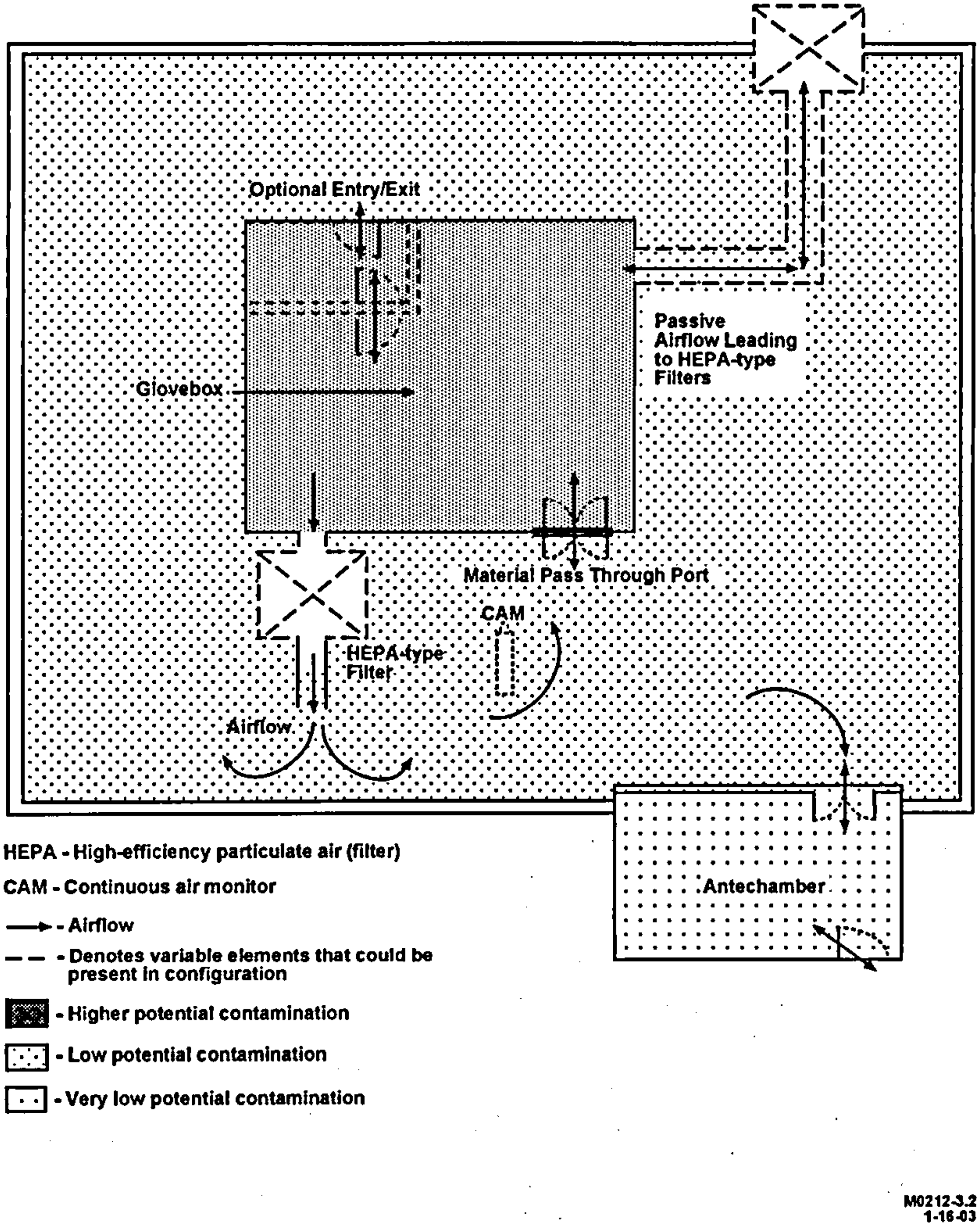

Figure 3. Alternate Conceptual Configuration for Category 1, High Risk with Two Controlled Air Spaces.

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Table 1. Containment Guidance for Specific Work Activities.

Removable contamination level	Contamination stability	Operation	Containment risk level
<10,000 dpm/100 cm^2 β/γ or <200 dpm/100 cm^2 α 6	Very stable 4	Simple material movement 5	Very low risk Total = 15-20
<100,000 dpm/100 cm^2 β/γ or <2,000 dpm/100 cm^2 α 12	Moderately stable 8	Vigorous material movement 10	Low risk Total = 21-31
<1,000,000 dpm/100 cm^2 β/γ or <20,000 dpm/100 cm^2 α 18	Low stability 12	Use of power tools in area or manual cutting, shaping, or abrading of material 15	Moderate risk Total = 32-45
>1,000,000 dpm/100 cm^2 β/γ or >20,000 dpm/100 cm^2 α 24		Use of low velocity power tools to cut, shape, or abrade material 20	High risk Total >45
		Use of high velocity power tools to cut, shape, or abrade material 25	
___	+ ___	+ ___	= ___

Instructions: Select the appropriate block from each of the first three columns. Add the numbers from the appropriate block in each column and select the appropriate containment class.

- Containment requirements could be revised up or down based on general area contamination levels, dose rates, personnel protective equipment needs, or other engineered controls applied in concert with a specific type of containment.
- When contamination levels cannot be verified, either by survey or historical data, the most reasonable limiting level for contamination will be used.
- The values on the chart call for subjective analysis based on ALARA principles and compliance with general radiological practices at Hanford. The radiological control organization and facility management jointly will be responsible for determining appropriate containment requirements and documenting these in controlling radiological documentation and work packages/procedures.

Table 2. Categories, Risks and Controls for Specific Work Activities.

Work Location/ Condition	Risk Level (see Table 1)	Additional Containment	Periodic Confirmatory Measurements	Documentation Required
Category 1 – General Characterization/Stabilization				
Outdoors or inside stagnant, passively ventilated, or open buildings	VLR or LR	None required	Radiation survey	Entry on logsheet.
Inside stagnant or passively ventilated building	MR	Containment room, certified glovebag or greenhouse, or as determined by radiological documentation/work package	Radiation survey	Entry on logsheet, track surface area.
Outdoors or open buildings	MR	Certified glovebag or greenhouse or as determined by radiological documentation /work package	Radiation survey	Entry on logsheet, track surface area.
Inside stagnant or passively ventilated building	HR	Containment room, certified glovebag or greenhouse (with negative pressure air flow), or as determined by radiological documentation /work package	Radiation survey and/or CAM results if required by radiological documentation	Entry on logsheet, track surface area.
Outdoors or open buildings	HR	Containment room, certified glovebag or greenhouse (with negative pressure air flow), or as determined by radiological documentation /work package	Radiation survey and/or CAM results if required by radiological documentation	Entry on logsheet, track surface area.
High inventory behind minimum of two air spaces	HR	Containment room, certified glovebag and/or greenhouse, with antechamber (with negative pressure air flow or as determined by radiological documentation /work package)	Radiation survey and/or CAM results if required by radiological documentation	Entry on logsheet, track surface contamination levels in antechamber air space.
Category 2 -- Excavation				
Excavation	VLR	None required	Radiation survey	Entry on logsheet.
Excavation	LR	None required	Radiation survey	Entry on logsheet, track volume.
Excavation	MR	Apply fixatives or other controls as determined by radiological documentation /work package	Radiation survey	Entry on logsheet, track volume.
Excavation	HR	Apply fixatives and/or certified glovebag or greenhouse or as determined by radiological documentation /work package	Radiation survey and/or CAM results if required by radiological documentation	Entry on logsheet, track volume.

CAM = continuous air monitor (room air type)
HEPA = high-efficiency particulate air
HR = high risk
LR = low risk
MR = moderate risk
VLR = very low risk.

Table 3. Potential Release Ci Tracking Factors.

Work Activity (Location/ Risk Level)	α Contam. Level (dpm per 100 cm²)*	β/γ Contam. Level (dpm per 100 cm²)*	Release fraction	α Ci per surface area or volume	β/γ Ci per surface area or volume
Category 1 – Characterization/Stabilization					
VLR Activities	200	10,000	1.0 E-3	8.4 E-13 Ci/ft²	4.2 E-11 Ci/ft²
LR Activities	2,000	100,000	1.0 E-3	8.4 E-12 Ci/ft²	4.2 E-10 Ci/ft²
MR Activities	20,000	1,000,000	1.0 E-3	8.4 E-11 Ci/ft²	4.2 E-9 Ci/ft²
HR Activities	100,000	5,000,000	1.0 E-3	4.2 E-10 Ci/ft²	2.1 E-8 Ci/ft²
Category 2 – Excavation					
VLR Activities	200	10000	1.0 E-3	8.8 E-9 Ci/ft³	2.1 E-8 Ci/ft³
LR Activities	2,000	100,000	1.0 E-3	8.8 E-8 Ci/ft³	2.1 E-7 Ci/ft³
MR Activities	20,000	1,000,000	1.0 E-3	8.8 E-7 Ci/ft³	2.1 E-6 C/ft³
HR Activities	100,000	5,000,000	1.0 E-3	4.4 E-6 Ci/ft³	1.0 E-5 Ci/ft³

* Contamination levels reflect upper threshold for risk category for estimation purposes.

Ci = curie.
HR = high risk
LR = low risk
MR = moderate risk
VLR = very low risk.

Table 4. Basis for Baseline Bounding Building.

Representative buildings (worst case)	Source Term	% disturbed	Release fraction	Release Rate (Ci/yr)
231-Z Building **α (as Am-241)** **β/γ (as Cs-137)**	21 Ci α 0 Ci β/γ	0.01%	1.0 E-3	2.1 E-6 α 0.0 E+ β/γ
UO3 Building **α (as Am-241)** **β/γ (as Cs-137)**	37 Ci α 0 Ci β/γ	0.01%	1.0 E-3	3.7 E-6 0.0 E+0
242-B/BL **α (as Am-241)** **β/γ (as Cs-137)**	2 Ci α 100 Ci β/γ	0.01%	1.0 E-3	2.0 E-7 1.0 E-5
Baseline - Hypothetical Bounding Building Total	25 Ci α (as Am-241) 100 Ci β/γ (as Cs-137)	0.01%	1.0 E-3	2.5 E-6 1.0 E-5
Baseline - Special Case UO3 Building Total	100 Ci α (as u-234) 1 Ci β/γ (as Cs-137)	0.01%	1.0 E-3	1.0 E-5 1.0 E-7

Table 5. Annual Possession Quantity and Bounding Potential Release Rates.

Work Activity (Location/ Condition)	APQ	% disturbed	Release fraction	Potential release (Ci/yr)
Category 1 – Characterization/ Stabilization Hypothetical Bounding Building	25 Ci α (as Am-241) 100 Ci β/γ (as Cs-137)	1%	1.0 E-3	2.5 E-4 Ci alpha 1.0 E-3 Ci beta
Category 1 – Characterization/ Stabilization Special Case UO3 Building	100 Ci α (as u-234) 1 Ci β/γ (as Cs-137)	1%	1.0 E-3	1.0 E-3 Ci alpha 1.0 E-3 Ci beta
Category 2 – Excavation Hypothetical Bounding Building	25 Ci α (as Am-241) 100 Ci β/γ (as Cs-137)	10%	1.0 E-3	2.5 E-3 Ci alpha 1.0 E-3 Ci beta
Category 2 – Excavation Special Case UO3 Building	100 Ci α (as u-234) 1 Ci β/γ (as Cs-137)	10%	1.0 E-3	1.0 E-2 Ci alpha 1.0 E-2 Ci beta

APQ = annual possession quantity
Ci = curie

Table 6. Potential Bounding Unabated and Abated Emissions.

Hypothetical bounding building/facility located on Central Plateau	Potential release (Ci/yr)	Unit dose factor (mrem/Ci)	Unabated dose (mrem/yr)	Abated dose* (mrem/yr)
Special Case UO3 Building				
Total α (as uranium-234) baseline	1.0 E-5	4.2 E+0	4.2 E-5	4.2 E-5
Total β/γ (as cesium-137) baseline	1.0 E-7	3.1 E-1	3.1 E-8	3.1 E-8
Total α (as uranium-234) cat 1 & 2	1.1 E-2	4.2 E+0	4.6 E-2	4.6 E-2
Total β/γ (as cesium-137) cat 1 & 2	1.1 E-2	3.1 E-1	3.4 E-3	3.4 E-3
Total			**4.9 E-2**	**4.9 E-2**
Hypothetical bounding building/facility				
Total α (as americium-241) baseline	2.5 E-6	1.7 E+1	4.3 E-5	4.3 E-5
Total β/γ (as cesium-137) baseline	1.0 E-5	3.1 E-1	3.1 E-6	3.1 E-6
Total α (as americium-241) cat 1 & 2	2.8 E-3	1.7 E+1	4.8 E-2	4.8 E-2
Total β/γ (as cesium-137) cat 1 & 2	1.1 E-2	3.1 E-1	3.4 E-3	3.4 E-3
Total			**5.1 E-2**	**5.1 E-2**

* abatement factor of 0.005 could be used for Category 1, high and moderate risk with one or more controlled air spaces, but no credit is taken for this NOC.

Ci = curie
mrem/Ci = millirem per curie
mrem/yr = millirem per year

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APPENDIX A

CONTAINMENT SELECTION GUIDE

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APPENDIX A

CONTAINMENT SELECTION GUIDE

To select the containment type, use the risk level determined using the information in Table 1 as follows.

VERY LOW RISK

- No specific containment beyond the administrative controls of good work practices applies. In this category, containment might be a damp rag, sleeving, an air curtain, or a plastic bag.
- No RCT certification is required.

LOW RISK

- The containment device must be specified in the work document. Examples are: catch containments, drip pans, bull pens, sleeving, air curtains, use of a vacuum cleaner, etc.
- No RCT certification is required, but the work package must describe the containment device or method.

MODERATE RISK

- The containment forms a total enclosure, such as heavy sleeving, glovebags, or containment tents.
- The work document must clearly specify the type of containment and include steps for installation, certification, decontamination, and removal of the containment from of the work area. The work package must include the certification checklist.
- RCT certification is required before initial use and daily during the work evolution.

HIGH RISK

- Containment is accomplished by use of negatively ventilated tents or glovebags.
- The work document must clearly specify the type of containment and include steps for installation, certification, decontamination, and removal of the containment from of the work area. The negative ventilation device type and use also must be addressed. The work package must include the certification checklist.
- RCT certification is required before initial use and daily during the work evolution.

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APPENDIX B

GUIDANCE FOR USE OF A CONTAINMENT TENT/GREENHOUSE/ENCLOSURE CERTIFICATION CHECKLIST

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APPENDIX B

GUIDANCE FOR USE OF A CONTAINMENT TENT/GREENHOUSE/ENCLOSURE CERTIFICATION CHECKLIST

The following are guidelines for performing an inspection of a containment tent or greenhouse and completing RCT certification of the containment.

1. The tent/greenhouse/enclosure is free of tears, loose seams, cuts, or other loss of integrity.

The tent/greenhouse should be thoroughly inspected to make sure there are no tears or loose seams. Give special emphasis to those areas of the tent or greenhouse where higher levels of contamination are expected to be present (i.e., the work area within the structure).

2. The tent/greenhouse/enclosure is properly oriented and supported.

The tent/greenhouse should be supported so that the walls are not bunched, stretched, or sagging, and will not collapse when HEPA-filtered ventilation is operated. Elastic cord always should be used with a containment tent to avoid undue stress on the containment grommets or other tie-offs.

3. Sharp objects are covered properly to prevent inadvertent penetration of the tent/greenhouse/enclosure.

If heavy objects will be used inside the containment, a liner made of metal, wrapped plywood, or other padding should be placed upon the floor to prevent damage. Sharp or rough edges on objects within the containment should be padded. Sharp tools should be covered when not in use.

4. Installed services use service sleeves and are taped.

All service lines and cords should enter the containment through service sleeves. All service sleeves should be taped securely to the item passing through it. Service lines should be long enough to allow ease of use, but should not cause a tripping hazard.

5. Unused service sleeves are sealed or properly taped closed.

Check each unused sleeve to ensure sleeve is properly sealed or taped closed.

6. Radiological postings and protective clothing removal procedures are posted prominently at the entrance/exit.

Radiological postings and undressing instructions should be placed where these are easily read.

7. Step-off pad(s), clothing, and waste receptacles are in place.

Step off pads should be placed at the exit of the containment or area as required. There should be a sufficient number of containers for used protective clothing and waste at the exit.

8. Doors work properly.

Physically check the operation of all doors, if possible, to make sure these work properly. Zippers tend to fail where they turn corners. If the door was made so that the door can be secured by lacing wire through grommets (or equivalent), make sure the door can be secured properly.

9. The tent seal to the component is made properly.

The tent seal to components is critical. Wherever possible, the seal should be made with clamps, double-sided tape, cable ties, bolting rings, etc., rather than just taping to the component.

10. If HEPA-filtered ventilation is used: the system is installed properly, including connections, proper labeling, proper airflow, and current efficiency test label.

Verify there is air in-flow to the containment entrance by observing sidewalls or doors for signs of inward "bowing". If possible, check airflow patterns with a smoke or powder.

If possible, an elephant trunk should be used inside the containment so that personnel can position the ventilation close to the area being worked. If needed, screens should be placed over the hose end to prevent loose materials from plugging the filter. For high contamination levels, a pre-filter should be used to protect the HEPA filters.

11. Proper lighting is provided.

Clear or translucent windows generally will allow sufficient light into the containment during daylight or in well-lit areas. If temporary lighting is needed, use of "shatter-proof" fluorescent lights provide-less chance for fire if the bulb touches material in the containment. If incandescent lights must be used, bulbs should be 50 watts or less and have protective shrouds. When possible, install the lighting outside the containment and provide a window for the light. Containment tents/greenhouses being certified for use at night should include a check of the lighting as part of the certification process.

12. If welding, grinding, or burning is to be done inside or near a tent/greenhouse/enclosure: the affected areas are covered with flame retardant materials.

In addition to using approved flame-resistant materials inside the containment, a fire extinguisher should be available immediately near the containment entrance.

Spark arrestors should be used if sparks or hot particles could be pulled into the vacuum system.

13. The *RCP Containment Identification/Inspection Tag* is posted on or near the tent/greenhouse/enclosure.

The person responsible for inspecting the containment should complete a containment identification/inspection tag and attach these to the containment. The RCT documents routine inspections on the tag. The RCT completes a containment certification checklist to verify initial certification.

APPENDIX C

GUIDANCE FOR USE OF A GLOVEBAG CERTIFICATION CHECKLIST

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APPENDIX C

GUIDANCE FOR USE OF A GLOVEBAG CERTIFICATION CHECKLIST

The following are guidelines for performing an inspection of glovebags and completing RCT certification of the containment.

1. The glovebag is free of tears, holes, or defects in materials.

Inspect all seams and seals. Using the thumb, apply moderate pressure to the seam to verify the seam is sealed properly. Tug on the sleeves to verify the connection is solid.

2. Components and surfaces inside the glovebag are covered to minimize decontamination.

Non-essential surfaces that could become contaminated during work should be covered with plastic or tape. Glovebags installed on valves or switches should not cover the identification labels if possible. Notify the person in charge to ensure temporary identification plates are installed, if permanent ones are not visible.

3. The glovebag is protected from sharp objects, both internal and external.

Sharp corners of objects inside and outside of the glovebag should be padded or taped before the glovebag is installed. Protective covers should be installed on components near the glovebag that could be damaged during the planned work.

4. The glovebag and installed service sleeves are supported properly.

Elastic cord always should be used to support a glovebag so the personnel will not damage the bag during work operations. Services passing through the sleeve should be supported independent of the glovebag.

5. The gloves are attached properly and free of cracks, splits, or holes.

Ensure that right- and left-hand gloves are installed in the proper sleeves with thumbs tilted a bit inward.

6. The glovebag seal to the component is adequate.

The connection between the glovebag and the component is a critical connection that often is made over an irregular surface. Special consideration could be required to ensure this connection remains secure during work operations. Stress test the connection by physically pulling on the glovebag to simulate the work conditions expected.

7. The glovebag is aligned properly to allow access to the work.

Personnel working in the glovebag must be able to reach the work. Verify that the alignment of the glovebag minimizes interference in the work area and that all areas in the bag can be reached easily.

8. If a drain is used: the drain is located in the low point of the glovebag, is unobstructed, and is securely fastened to an appropriate collection system.

If liquids will be introduced into the glovebag during the job, a "leak test" of the bag should have been performed as part of the installation process. Glovebags containing drain fittings should not have absorbent material in the bag that could block the drain. The drain should be connected securely to an appropriate collection device such as a poly bottle or radioactive liquid drain system.

9. If a vacuum is used with the glovebag: the vacuum is HEPA-filtered and has a current efficiency test label.

Operate the vacuum cleaner to ensure the glovebag does not collapse during use. A breather filter should be installed on the glovebag to allow make-up air to enter the glovebag when the vacuum is operated. A tag on the vacuum cleaner should indicate the date of the last efficiency test and the expiration date. If the date will expire before the job is completed, consider retesting the vacuum cleaner before use, or replace it.

If pneumatic-powered tools will be used in the glovebag, ensure that an exhaust system capable of handling the discharge air is attached to the glovebag. If possible, test operation of the air tools and exhaust system in the glovebag before beginning work in the glovebag.

10. The pass in/out box is installed properly.

Verify that smears can be placed easily into and removed from the pass in/out box.

Verify that Velcro™ flaps on the inside and the outside of the box seal completely to prevent the spread of contamination during work in the glovebag.

11. The *RCT Containment Identification/Inspection Tag* is posted on or near the glovebag.

The person responsible for inspecting the containment should complete a containment identification/inspection tag and attach the tag to the containment upon completion of the inspection.

The RCT documents the routine inspections on the tag. The RCT completes a certification checklist to verify initial certification.

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APPENDIX D

EXAMPLE LOGHEETS FOR CHARACTERIZATION, EXCAVATION, AND LIQUID REMOVAL ACTIVITIES

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General Characterization/Stabilization (Category 1) Activities (diffuse/fugitive)

Facility________________________

Date(s) of operation	Risk Level	Location/ Condition	Survey Results (dpm/100 cm^2)		Surface area of final containment or posted CA (ft^2)	Alpha Release (Ci)[1]	Uranium Release (Ci)[1]	Beta/gamma Release (Ci)[1]
			Alpha	Beta/gamma				

[1] Multiply the surface area by the appropriate Table 3 Ci/ft^2 factor :

	Alpha	Beta/Gamma	α with HEPA Vacuum	β/γ with HEPA Vacuum
VLR = very low risk characterization/stabilization activities	*	*	8.4 E-10 Ci/ft^2	4.2 E-8 Ci/ft^2
LR = low risk characterization/stabilization activities	*	*	8.4 E-9 Ci/ft^2	4.2 E-7 Ci/ft^2
MR = moderate risk characterization/stabilization activities	8.4 E-11 Ci/ft^2	4.2 E-9 Ci/ft^2	8.4 E-8 Ci/ft^2	4.2 E-6 Ci/ft^2
HR = high risk characterization/stabilization activities	8.4 E-10 Ci/ft^2	2.1 E-8 Ci/ft^2	8.4 E-7 Ci/ft^2	2.1 E-5 Ci/ft^2

* As shown in Table 2, tracking of surface area not required for VLR and LR characterization/stabilization activities (but required for HEPA vacuum use)

Excavation (Category 2) Activities (diffuse/fugitive)

Facility____________________

Date(s) of operation	Risk Level	Location/ Condition	Survey Results (dpm/100 cm²)		Volume of Soil (ft^3)	Alpha Release (Ci)[1]	Uranium Release (Ci)[1]	Beta/gamma Release (Ci)[1]
			Alpha	Beta/gamma				

[1] Multiply the volume of soil by the appropriate Table 3 Ci/ft³ factor :

	Alpha	Beta/Gamma	α with truck-mounted vacuum	β/γ with truck-mounted vacuum
VLR = very low risk excavation activities	*	*	8.8 E-6 Ci/ft³	2.1 E-5 Ci/ft³
LR = low risk excavation activities	8.8 E-8 Ci/ft³	2.1 E-7 Ci/ft³	8.8 E-5 Ci/ft³	2.1 E-4 Ci/ft³
MR = moderate risk excavation activities	8.8 E-7 Ci/ft³	2.1 E-6 Ci/ft³	8.8 E-4 Ci/ft³	2.1 E-3 Ci/ft³
HR = high risk excavation activities	4.4 E-6 Ci/ft³	1.0 E-5 Ci/ft³	4.4 E-3 Ci/ft³	1.0 E-2 Ci/ft³

* As shown in Table 2, tracking of volume not required for VLR excavation (but required for truck-mounted vacuum use)